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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,124	12/23/2005	Kenichi Fukuoka	28955.1070	6278

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STEPTOE & JOHNSON LLP
1330 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

EXAMINER	
WILSON, MICHAEL H	
ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
12/21/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,124	FUKUOKA ET AL.	
	Examiner	Art Unit	
	MICHAEL WILSON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,22,23,27,28,30 and 32-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,22,23,27,28,30 and 32-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20090526; 20090930*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 September 2009 has been entered.

Response to Amendment

2. This Office action is in response to Applicant's amendment filed 21 September 2009, which cancels claims 7-21, 24, 26, 29, and 31, amends claims 1, 22, 27, 28, and 30, and adds new claims 32-37.

Claims 1, 22, 23, 27, 28, 30, and 32-37 are pending.

3. The rejection of claims 7, 8, 14, 18-23, 30 and 31 are under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is moot due to applicants cancelling or amending of the claims in the reply filed 21 September 2009.

4. The rejection under 35 U.S.C. 102(b) of claim 9 as being anticipated by Tanaka et al. (US 6,107,734), is moot due to Applicant's canceling of the claim in the reply filed 21 September 2009.

5. The rejection(s) under 35 U.S.C. 103(a) of claims 7, 24, 26, and 31 as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1) is moot due to applicant's canceling of the claims in the reply filed 21 September 2009.

6. The rejection(s) under 35 U.S.C. 103(a) of claims 10-12 as being unpatentable over Tanaka et al. (US 6,107,734) in view of Liao et al. (US 2003/0170491 A1) is moot due to applicant's canceling of the claims in the reply filed 21 September 2009.

7. The rejection(s) under 35 U.S.C. 103(a) of claims 13, 17, and 29 as being unpatentable over Parthasarathy et al. (US 6,420,031 B1) in view of Mori (US 6,215,245 B1) is moot due to applicant's canceling of the claims in the reply filed 21 September 2009.

8. The rejection(s) under 35 U.S.C. 103(a) of claims 14-16 as being unpatentable over Parthasarathy et al. (US 6,420,031 B1) in view of Tsutsui et al. (US 2003/0127967 A1) and Okada et al. (US 6,143,434) is moot due to applicant's canceling of the claims in the reply filed 21 September 2009.

9. The rejection(s) under 35 U.S.C. 103(a) of claims 18-21 and 30 as being unpatentable over Tanaka et al. (US 6,107,734) is moot due to applicant's canceling of the claims in the reply filed 21 September 2009.

Information Disclosure Statement

10. Documents AA and AF in the IDS filed 30 September 2009 are crossed out because they have previously been cited and considered.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 22, 23, 30, and 35-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Keisuke et al. (JP 2002/367784 A), machine translation relied upon.

Regarding claims 22, 23, 30, and 35-37, Keisuke et al. disclose an organic electroluminescent device comprising a substrate, an anode, a hole injection layer, a hole transporting layer, an emitting layer, an electron injection layer, and a cathode [0031]. The electron injection layer comprises a metal oxide, MoO_3 or $VO_{2.5}$ (V_2O_5) [0020], and an alkali metal [0023] and discloses the alkali metal to be Cs [0157]. The alkali metal is disclosed to comprise 0.1 to 16% by weight of the layer [0025]. The device is disclosed to be used in a flat-panel display [0002].

While the reference does not specifically disclose the electron injection layer comprising MoO_3 and Cs as a bipolar charge injection layer the layer is the same as disclosed by applicant to posses the properties of a bipolar charge injection layer. Therefore since the layer disclosed by Keisuke et al. being within the formula claimed by applicant, the layer would be expected inherently to have the same properties as disclosed by applicant. Recitation of a newly disclosed property does not distinguish over a reference disclosure of the article or composition claims. *General Electric v.*

Jewe Incandescent Lamp Co., 67 USPQ 155. *Titanium Metal Corp. v. Banner*, 227 USPQ 773. Applicant bears responsibility for proving that reference composition does not possess the characteristics recited in the claims. *In re Fritzgerald*, 205 USPQ 597, *In re Best*, 195 USPQ 430.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 1, 22, 23, 28, 30, and 32-37, and are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1).

Regarding claims 1, 32, and 33, Tanaka et al. disclose an organic electroluminescent device comprising at least two light-emitting layers between an

anode and a cathode (column 2, lines 53-54) and an intermediate electrode layer being interposed between emitting layers (column 2, lines 56-60). The intermediate electrode is disclosed to comprise a single layer or a multilayer structure of a plurality of layers (column 7, lines 42-67). The reference discloses that the semiconducting material may be an acceptor that is a conductive oxide containing a transition metal, CuO, (column 8, lines 12 and 29), and a donor that is an alkali metal and/or an alkaline earth metal (column 8, lines 6-8 and 19-20). The reference also discloses that electrode material and compounds with electron injection ability may be used in the intermediate layer (column 7, lines 48, 49-50; column 8, lines 7-8). However the reference does not explicitly disclose IrO_2, MoO_2, NbO, OsO_2, ReO_2, or ReO_3 as suitable material.

Mori teaches a similar electroluminescent device with a cathode that has improved interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2). The reference teaches IrO_2, MoO_2, NbO, OsO_2, ReO_2, or ReO_3 are suitable compounds for use in the cathode (column 3, lines 50-52).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the transition metal oxides of Mori with the device of Tanaka et al. One of ordinary skill would reasonably expect success because Mori teaches the compounds as suitable for cathodes and teaches the compounds to stabilize alkali metals in a cathode (column 3, lines 29-32).One of ordinary skill in the art would be motivated by a desire to improve interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Tsutsui et al. teach a similar organic electroluminescent device [0001] with an intermediate electrode (figures 2B and 7). The reference teaches n-type and p-type materials mixed into the same layer ([0110] and [0117]) making a single donor-acceptor layer as an intermediate layer (electrode). The reference also teaches using alkali metals in the same layer [0117].

It would be obvious to one of ordinary skill in the art at the time of the invention to add the teaching of Tsutsui et al. to the device of modified Tanaka et al. making the layer containing the n-type and p-type semiconductors and the electron injection ability compound in to a single layer. One of ordinary skill would reasonably expect such a combination would be suitable given that Tsutsui et al. teach the materials may be used in the same layer. One of ordinary skill would be motivated by a desire to simplify the layer design of the device.

Regarding claims 22, 35, and 36, Tanaka et al. disclose an organic electroluminescent device comprising a light-emitting layer between an anode and a cathode (column 2, lines 53-54). The reference also discloses a substrate (under the anode) a hole injection layer and a hole transport layer on the anode and an electron injection layer on the light emitting layer (example 1 columns 9 and 10). The electron injection layer is also disclosed to be an intermediate conductive layer (or intermediate electrode) (column 9, lines 60-64). The intermediate conductive layer is disclosed to comprise a single layer or a multilayer structure of a plurality of layers (column 7, lines 42-67). The reference discloses that the semiconducting material may be an acceptor that is a conductive oxide containing a transition metal, CuO, (column 8, lines 12 and

29), and a donor that is an alkali metal (column 8, lines 6-8 and 19-20) and discloses Li used in the electron injection layer (column 9, line 60-64). However the reference does not explicitly disclose IrO_2, MoO_2, NbO, OsO_2, ReO_2, or ReO_3 as suitable material or that the metal oxide and alkali metal are mixed (in the same layer).

Mori teaches a similar electroluminescent device with a cathode that has improved interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2). The reference teaches IrO_2, MoO_2, NbO, OsO_2, ReO_2, or ReO_3 are suitable compounds for use in the cathode (column 3, lines 50-52).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the transition metal oxides of Mori with the device of Tanaka et al. One of ordinary skill would reasonably expect success because Mori teaches the compounds as suitable for cathodes and teaches the compounds to stabilize alkali metals in a cathode (column 3, lines 29-32).One of ordinary skill in the art would be motivated by a desire to improve interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Tsutsui et al. teach a similar organic electroluminescent device [0001] with an intermediate electrode (figures 2B and 7). The reference teaches n-type and p-type materials mixed into the same layer ([0110] and [0117]) making a single donor-acceptor layer as an intermediate layer (electrode). The reference also teaches using alkali metals in the same layer [0117].

It would be obvious to one of ordinary skill in the art at the time of the invention to add the teaching of Tsutsui et al. to the device of modified Tanaka et al. making the

layer containing the n-type and p-type semiconductors and the electron injection ability compound in to a single layer. One of ordinary skill would reasonably expect such a combination would be suitable given that Tsutsui et al. teach the materials may be used in the same layer. One of ordinary skill would be motivated by a desire to simplify the layer design of the device.

While the reference does not specifically call the electron injection layer a bipolar charge injection layer the layer, the electron injection layer of modified Tanaka et al. is the same as disclosed by applicant to posses the properties of a bipolar charge injection layer. Therefore since the layer disclosed by modified Tanaka et al. being within the formula claimed by applicant, the layer would be expected inherently to have the same properties as disclosed by applicant. Recitation of a newly disclosed property does not distinguish over a reference disclosure of the article or composition claims. *General Electric v. Jewe Incandescent Lamp Co.*, 67 USPQ 155. *Titanium Metal Corp. v. Banner*, 227 USPQ 773. Applicant bears responsibility for proving that reference composition does not possess the characteristics recited in the claims. *In re Fritzgerald*, 205 USPQ 597, *In re Best*, 195 USPQ 430.

Regarding claim 23, modified Tanaka et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the content of the element (Li) is 1.5% (column 9, lines 60-64), but does not explicitly disclose a range for the wt% of the element content.

Although the reference does not disclose a wt% of 2 to 20%, it is the examiner's position that the values are close enough that one of ordinary skill in the art would have

expected the same properties. Case law holds that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Case law holds that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

In light of the case law cited above and given that there is only a "slight" difference between the amount of Li (the element) disclosed by Tanaka et al. and the amount disclosed in the present claims and further given the fact that no criticality is disclosed in the present invention with respect to the amount of Li (the element), it therefore would have been obvious to one of ordinary skill in the art that the amount of Li (the element) disclosed in the present claims is but an obvious variant of the amounts disclosed in Tanaka et al., and thereby one of ordinary skill in the art would have arrived at the claimed invention.

Regarding claim 28, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the device is comprised in a display device, such as an SVGA screen of over 12 inches (column 3, lines 42-48).

Regarding claim 30, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the device is comprised in a display device, such as an SVGA screen of over 12 inches (column 3, lines 42-48).

Regarding claim 34, modified Tanaka et al. discloses all the claim limitations as set forth above. While the reference discloses using an alkali metal in the intermediate layer (column 8, lines 6-8 and 19-20) it does not explicitly disclose using Cs. However given that there are only 5 common alkali metals (Li, Na, K, Rb, and Cs) each metal would be readily envisioned by one of ordinary skill in the art would readily expect each of the alkali metals to be suitable and would expect similar results.

Regarding claim 37, modified Tanaka et al. discloses all the claim limitations as set forth above. While the reference discloses using an alkali metal in the intermediate layer (column 8, lines 6-8 and 19-20) it does not explicitly disclose using Cs. However given that there are only 5 common alkali metals (Li, Na, K, Rb, and Cs) each metal would be readily envisioned by one of ordinary skill in the art would readily expect each of the alkali metals to be suitable and would expect similar results.

16. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1) as applied to claim 22 above, and in view of Forrest et al. (US 5,703,436).

Regarding claim 27, modified Tanaka et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose that the cathode and bipolar charge injection layers are the same.

Forrest et al. teach a similar electroluminescent device where the cathode and intermediate electrodes (or bipolar charge injection layers) are the same (column 4, line 49 to column 5, line 14; and figure 2c).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Forrest et al. with the device of Tanaka et al. One of ordinary skill would reasonably expect success given that both references disclose similar devices with multiple emitting layers separated by connecting layers. One of ordinary skill would be motivated by a desire to simplify the device for easier manufacturing.

Response to Arguments

17. Applicant's arguments filed 26 November, 2008 have been fully considered but they are not persuasive.

Applicant argues that Tanaka et al. (US 6,107,734) does not disclose applicants' claimed intermediate electrode layer. Tanaka et al., applicants assert, nowhere disclose an intermediate electrode layer comprising a semiconductive material comprising an acceptor that is a conductive oxide containing a transition metal, and a donor, in the same layer but teach stacked layers of P-type semiconductor and N-type semiconductor. The examiner agrees that Tanaka et al. *alone* does not teach a layer with the metal oxide and alkali metal mixed. The rejection of record is not Tanaka et al. alone but a combination of Tanaka et al. (US 6,107,734), Mori (US 6,215,245 B1), and Tsutsui et al. (US 2003/0127967 A1). One cannot show nonobviousness by attacking references individually where the rejection is based on combinations of references. See

In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Tanaka et al. teach stacked P-type semiconductor and N-type semiconductor material the reference also teaches a single layer as one of the alternatives ((c), column 7, line 52) and that items (a) to (f) may be combined (column 61-63). Tsutsui et al. (US 2003/0127967 A1) teaches P-type semiconductor and N-type semiconductor material mixed into a single layer for an intermediate electrode. Therefore, as described above Tanaka et al. in view of Tsutsui et al. teach an intermediate electrode layer comprising a semiconductive material with an acceptor that is a conductive oxide containing a transition metal, and a donor, in the same layer.

Applicants argue regarding Mori et al. that while Mori states that conductive oxides are suitable for use in the cathode to stabilize the sodium or potassium material, Mori does not say that the conductive oxides enhance the injection efficiency of the cathode. However the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Mori et al. teach adding the conductive oxides with the electron injection ability alkali metal for the purpose of stabilizing the metal (column 3 lines 30-35), improving interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Further regarding Tanaka et al. applicants argue that Tanaka et al. says nothing about a hole injecting layer or electron injecting layer being a bipolar charge injection

layer comprising a mixture of a metal oxide and an alkali metal. However the reference does not need to use the same terminology as the present application. If the prior art device possesses the same layer arrangement and materials it would inherently perform the same function and posses the same properties. For example a prior art layer of m-MTDATA adjacent to the anode (a common hole injection layer) will perform the function of injecting hole into the light emitting-layer regardless of whether the prior art specifically says it does because the function of the layer is dependent on the inherent properties of the material. If the material possesses the necessary property (an appropriate ionization potential) it will perform the function (injecting holes) regardless of whether the prior art recognizes it does.

Regarding applicant's argument of unexpected results, it is well settled that evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains and that such evidence which is considerably narrower in scope than claimed subject matter is not sufficient to rebut a prima facie case of obviousness. *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ805, 808 (CCPA 1979). Also see *In re Boesch*, 617 F.2d at 276, 205 USPQ at 219; *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) and *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). As rejected claims 1 and 22 are significantly broader than examples in specification, which applicant cites as an example of unexpected results and which are limited to a comparison of Cs/MoO_x to Alq/Li and ITO, the evidentiary showing is far from being commensurate in scope with the degree of patent protection sought. *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (fed. Cir. 1990)

("'[O]bjective evidence of nonobviousness must be commensurate in scope with the claims.'" (quoting *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ 805, 808 (CCPA 1979) ("The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.").

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794

MHW